

CLAIMS

What is claimed is:

1. An apparatus for forming a reducer/expander duct member for use in an air handling system comprising,
 - a housing comprising a first workstation and a second workstation;
 - the first work station comprising a channel for accommodating a first cylindrical work piece of a first diameter and a first positioning member for aligning a frustoconical work piece for coupling to the first cylindrical work piece;
 - the second work station comprising a channel for accommodating a second cylindrical work piece of a second diameter and a second positioning member for aligning a frustoconical work piece for coupling to the second cylindrical work piece,
 - a first die associated with said first work station which is selectively positioned at a predetermined location relative the frustoconical work piece and the first cylindrical work piece positioned in said first work station,
 - a second die associated with said second work station which is selectively positioned at a predetermined location relative to said frustoconical work piece and the second cylindrical work piece positioned in said second work station,
 - wherein said first and second dies are different sizes adapted to accommodate different diameters of the first and second cylindrical work piece,
 - a first coupling assembly associated with said first work station which cooperates with said first die to selectively couple the frustoconical work piece and the first cylindrical work piece, and
 - a second coupling assembly associated with said second work station which cooperates with said second die to selectively couple the frustoconical work piece and the second cylindrical work piece.
2. The apparatus of claim 1, wherein the first positioning member is at least partially formed as a conical section.

3. The apparatus of claim 1, wherein the second positioning member is at least partially formed having a conical aperture.
4. The apparatus of claim 1 further comprising a part ejection system associated with the first workstation.
5. The apparatus of claim 1, wherein the first positioning member comprises a clearance portion allowing an operator to access and remove the frustoconical work piece and the attached first cylindrical work piece.
6. The apparatus of claim 1, wherein the first and second coupling assemblies each comprise at least one coupling bead wheel.
7. The apparatus of claim 1, wherein the second work station further comprises a clamping system to properly position and secure the frustoconical work piece and the attached first cylindrical work piece in a predetermined position for attachment of the second cylindrical work piece to the frustoconical work piece.
8. The apparatus of claim 1 further comprising a base plate at the bottom of each insertion channel of the first and second workstation.
9. The apparatus of claim 4, wherein the part ejection system comprises at least one hydraulically actuated piston positioned to raise a base plate at the bottom of the insertion channel of the first workstation.
10. The apparatus of claim 1, wherein the coupled portions of the reducer/expander duct member are formed perpendicular to a longitudinal axis of the reducer/expander duct.

11. The apparatus of claim 1, wherein the first die of the first workstation is adapted to exert a force against the frustoconical work piece and toward the first cylindrical work piece positioned within the insertion channel of the first workstation.
12. The apparatus of claim 1, wherein the first coupling assembly further comprises a rotating head.
13. The apparatus of claim 12, wherein the first positioning member is rotatably connected to the rotating head such that the first positioning member may remain stationary while the rotating head is rotating.
14. An apparatus for forming a reducer/expander duct member comprising:
 - a housing having a first position and a second position;
 - wherein the first position comprises an insertion channel for a first cylindrical work piece, a positioning member for a frustoconical work piece, and a means for coupling the cylindrical work piece to the frustoconical work piece;
 - wherein the second position comprises a second insertion channel for a second cylindrical work piece, a second positioning member for the frustoconical work piece, and a means for coupling the second cylindrical work piece to the frustoconical work piece.
15. The apparatus of claim 14, wherein the first positioning member is at least partially formed as a conical section.
16. The apparatus of claim 14, wherein the second positioning member is at least partially formed having a conical aperture.
17. The apparatus of claim 1 further comprising a part ejection system associated with the first workstation.

18. A method for forming a reducer/expander duct member for use in an air handling system comprising the steps of:

providing an apparatus having a first work station and a second work station;
inserting a first cylindrical work piece into an insertion channel of the first work station;
positioning a frustoconical work piece on a positioning member of the first work station,
coupling the first cylindrical work piece to the frustoconical work piece utilizing a die
and coupling wheel associated with the first work station;
inserting a second cylindrical work piece into an insertion channel of the second work
station;
positioning the frustoconical work piece on a positioning member of the second work
station; and
coupling the second cylindrical work piece to the frustoconical work piece utilizing a die
and coupling wheel associated with the second work station.